visual cells exist in these cases. I now call to mind the cases of Ostrea and Serpula. When the former has its purplish tentacles extruded from between its valves, and the latter its crown of cirri extended from its tube, if the hand is made to move rapidly over the water in the aquarium in a strong light, so as to cast a shadow upon these organs, both these animals appear to be sensitive to the movement, and independent of any jars or vibrations. The oyster, under these circumstances, at once retracts its sensitive mantle-border; the worms, their cirri.

Upon examining the end of the siphon of Mya arenaria, lines of pigment are found about the bases of both the inner and outer circlets of tentacles, and the upper end of the siphon is pigmented for about an inch, both inside and outside. On the outside, however, there are scattered low, minute, pigmented papillae just under the epidermis and in the pigmented layer or true skin covering the siphon. The questions now arise, What is the nature of these organs? and do not the habits of Ostrea, as above described, justify us in expecting to find rudimentary end-organs on the mantles and siphons of mollusks, answering the purpose of eyes, as appears to be the case in the instance of Solen? Mya, like Solen, in life has normally the end only of the siphon exposed: and visual powers, developed to a certain degree, would therefore be useful to the animal; for, when the siphon is extended above the level of the sand, there are several fishes with mouths and teeth well suited to nip it off, and which would doubtless actually take advantage of the helpless clam, if it could not appreciate their approach.

I find fishes much more sensitive to sudden vibrations established in the water in which they live than to shrill or grave sounds made in the surrounding air near by. This may be due to special powers of perception which they may possess on account of the development of the singular end-organs of the lateral line.

The study of dermal, terminal nerve-endings, modified as more or less specialized sensory apparatuses throughout the different groups of the animal kingdom, is bound to yield many important results in the near future, in addition to what is already known; and the writer is glad that the matter has been taken up by such competent hands. JOHN A. RYDER.

Nov. 27, 1883.

Probable occurrence of the Taconian system in Cuba.

Last year, while making two excursions across the mountains of eastern Cuba, between Baracoa and the southern coast, I had an opportunity to make some observations on the geological structure of these mountains. The rocks composing this end of Cuba fall naturally into three distinct groups, as follows: 1. Ancient, and for the most part coarsely crystalline, basic eruptive rocks; 2. Older stratified rocks, slates, schists, and limestones; 3. The post-tertiary limestones or elevated coral-reefs.

The eruptive rocks form the main mass of the mountains at most points. They appear on the shore in some places, and seem to be almost the only rocks found at greater distances than five or ten miles from the coast. The older stratified rocks occur principally in two irregular belts running parallel with the coasts, and lying one on either side of the great eruptive belt: hence they are found mainly on the flanks of the mountains. The stratified rocks, especially along their contact with the eruptives, are penetrated by numerous irregular masses and dikes of the latter. But that they are all older than all the eruptives is improbable, since the eruptives are themselves evidently of several distinct ages.

So far as I have observed, the stratified rocks are all alike unfossiliferous; and in consequence the precise determination of their stratigraphic positions is a difficult problem. I am satisfied, however, that some of them are widely separated in time. The newer beds, consisting chiefly of fissile slates, soft sandstones, and impure earthy limestones, are probably equivalent to the secondary and tertiary strata of San Domingo and Jamaica. These uncrystalline sediments occur chiefly on the northern slope of the mountains, and, although much disturbed and undulating, rarely exhibit high dips.

But on the south side of the dividing-ridge, or summit, I crossed a belt six to eight miles wide, reaching almost to the coast, of highly inclined crystalline schists. The stratification is usually distinct, the strike being parallel with the coast, or east-west. The schists are generally greenish, and are both hydromicaceous and chloritic. Associated with the schists are several immense beds of white crystalline limestone. The limestone undoubtedly belongs to the same series as the schists, and is often micaceous.

These rocks bear a strong resemblance to the Taconian system of western New England, and are essentially identical with the great series of semi-crystalline schists and limestones of Trinidad and the Spanish Main which I have elsewhere correlated with the Taconian.

The published reports on the geology of San Domingo and Jamaica show that the geologic structure of those islands is essentially similar to that of eastern Cuba. In each case there is a prominent axis of old eruptive rocks, flanked on either side by schists, slates, limestones, and other sedimentary formations, and by elevated coral-reefs. In San Domingo and Jamaica the eruptives are not wholly basic, but much granite occurs; and the metamorphic schists, which appear to be similar to those of Cuba, have been generally confounded with the cretaceous beds. I predict, however, that more careful study will show that they are distinct and vastly older, and that the Greater Antilles are similar in composition and structure to the southern coast of the Caribbean Sea, including the Spanish Main and Trinidad, except that the coral-reefs and the eruptive rocks are wanting in the latter region. We owe the coral-reefs largely to the great vertical movements of the Greater Antilles in recent times; and the eruptive rocks are but a continuation westward, and the older and more eroded portion, of the great Caribbee belt of volcanic rocks which begins a hundred miles north of Trinidad, and ends in Cuba, being about fifteen hundred miles long.

W. O. CROSBY.

THE RESTORATION OF ANCIENT TEMPLES.

The Parthenon: an essay on the mode by which light was introduced into Greek and Roman temples. By JAMES FERGUSSON, C.L.E., D.C.L., LL.D., etc. London, *Murray*, 1883. 8+135 p., 60 illustr., 4 pl. 4°.

ONLY a small portion of this book is devoted to the wonderful edifice from which it is named. It is in the main a reiteration of peculiar views concerning the lighting of ancient temples, — an amplification of theories advocated thirty-